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silt-laden condition had been suggested, rather than an argument based on the implied converse? The fact is evident, that the water on the west side is more heavily laden because erosion on that side is most active. This, of course, directs the search for the cause of erosion in another direction than the one which those who would fain persuade themselves and others that the improvement of the Mississippi is possible by the principles and methods now employed, would choose to take.

The variations of silt-burden at the mouth of the Mississippi, attributed to the influence of Missouri-River water and the erosions below Cairo, have their final explanation in dynamic conditions which may be local.

The quantity of material delivered by the Missouri into the Mississippi may be nearly equivalent to the quantity discharged by the Mississippi into the Gulf for any period without establishing a presumption of identity; since that quantity is small, compared with the total moved, as the result of erosions of bank and scour in bed, in the thirteen hundred miles between the entrance of the Missouri and the Gulf. No direct evidence has yet been obtained that any particle of sand has ever traversed the thirteen hundred miles without one or many rests; but there is much evidence that transportation of sediment is by intermittent steps, times of rest being far in excess of motion. That the quantity in motion varies enormously in a few miles' distance was shown by the Fulton observations of 1879 and 1880, and the variation in quantity was clearly accounted for by observed local erosions and deposits.

Erosions and the consequent silt movement are due to an excess of energy in the stream (energy is a function of mass and fall or slope) beyond that necessary to overcome bed-resistances, mostly friction. The excess must be expended where it occurs; and the work done in the way of destructive action on bed and bank, and in the transportation of eroded material, measures the excess. The amount of surplus energy varies with time and place; so, also, the work done.

To trace any instance of work to its cause is not possible or necessary. Apprehension of the fact that erosion and silt-transport, with the consequences, — a shifting channel and uncertain elevation of surface for a given volume, — are due to dynamic conditions dependent upon volume of water and its absolute height above sea-level, on the one hand, and the character of channel, its length, form, and material, on the other, will be a safeguard against many errors of interpretation, of which Mr. Harrod's note affords two examples.

ROBERT E. McMATH.

St. Louis, June 17.

Korean curios.

I enclose an extract from a letter from Lieut. G. C. Foulke, U. S. navy, of the U. S. legation at Seoul, Korea, in which he kindly gives more exact information in reference to my article in *Science*, vol. iv. p. 172, and also in regard to Prof. E. S. Morse's criticism on said article in *Science*, vol. iv. p. 270.

GEORGE F. KUNZ.

Min Yong Ik is a blood nephew of the Queen of Korea. His father gave him for adoption to Min Thai Ho, who was killed in the conspiracy of December, 1884. He is stated by orientals generally to be by affinity a prince, and so generally titled. The present king and queen have one child, a son, — the crown prince: by Korean rule, Min Yong Ik ranks next to him.

Min Yong Ik's thumb-ring is a *thumb-ring*: it is not in the least like an archery thumb-guard, which I never saw an *officer* have or use on any occasion, nor do they have or use such. Min's jade thumb-ring is one of a class of articles, among which are short strings of shell-beads, pieces of amber, etc., very commonly owned by Korean officers, as many persons use canes at home to occupy the hands to play with.

The gold ornament Min wore was a button indicating his rank: it was (as it must be) attached by a black silk cord to a hair frontal band.

I have heard from many people that at Kurngang San, on the east coast of Korea, were columns of stone more than six times the height of a man. Some said they were crystals; but others (and one eye-witness) do not speak of them as such. Probably the columns below the water in the sea presented that appearance. Most people say there were tree-like shaped stones. Kurngang San is the place spoken of by Prince Min to Mr. Kunz.

Professor Morse is quite correct in saying the social customs of the country would interfere with Min's bringing his wife to America. Min often said he intended to bring her, etc.; but his talk was perfect nonsense, for he never meant it.

An indian paint-cup.

While searching for Indian remains on an island in the Susquehanna, I found a paint-cup which is somewhat different from the ordinary. In place of a water-worn pebble which has had a natural hollow on one side, — and which is, I believe, the material invariably used, especially in the east, — this is made from a fragment of sandstone, which has been hollowed out entirely by artificial means. Some of the powdered oxide of iron still remains in the cup, and, if moistened, answers very well for a coloring-matter. The site where I found the cup has furnished quite a number of relics, and was very probably the rendezvous of fishing-parties.

HARVEY B. BASHORE.

West Fairview, Penn.

Premature appearance of the periodical cicada.

The communication of Prof. Lester F. Ward on this subject in *Science* (v. 476) will no doubt surprise other members of the Biological society of Washington as much as it did the undersigned.

Memory of a sound after the lapse of many years is untrustworthy, as a rule; and I was unwilling to accept as an established fact the statement of such an abnormal occurrence, which Professor Ward based solely on such memory. Yet I nevertheless endeavored to give reason for its possibility, there being a vast difference between a possibility and an established fact. Professor Ward then effectually weakened his testimony by evidence of faulty memory as to the season when Cicada septendecim was heard by him when a boy.

His evidence was rejected by me for that reason, and for the further reason, that, upon his own ground of rejecting inexpert testimony in memory of a visual impression as to hybrid oaks, we must reject his inexpert testimony in memory of an auditory impression as to Cicadas. I nowhere pronounced his Virginia observations 'wholly worthless,' nor the occurrence 'impossible as contrary to all canons of entomology.'

Professor Ward, in his private conversation with me, made no attempt to describe the notes of October last, but simply affirmed his recollection of them as similar to those of C. septendecim. His description in *Science* is of one of the notes of the species, and he seems to be ignorant of the fact that Cicada septen-

decim has several very distinct and variable notes. He has probably been misled by the abnormal condition of things the present year in the District of Columbia, where the English sparrow has so prevented the full maturity of the males, and so decimated their ranks, that the more characteristic noises, and those most apt to be recollected, have scarcely been heard. This has been a common remark among entomologists, who recollected former visitations in other parts of the country.

Finally, Professor Ward will convince no one that I was ever guilty of speaking of the note of *C. septendecim* as 'precisely like' that of *C. septendecim*, though the mature and louder note of the latter much more nearly resembles that of the former than he seems to imagine.

C. V. RILEY.

Washington, D.C., June 17.

Periodical cicada in Massachusetts.

Among the localities given by the earlier writers for the present septendecim brood of the periodical cicada, are Fall River and the south-eastern portion of Massachusetts. These need confirmation; as, so far, no reports have been received from Massachusetts the present year. There is a brood which appears at Fall River one year later. I shall be glad to get confirmation either of the absence or presence of the insect the present year from the readers of *Science* in south-eastern Massachusetts.

C. V. RILEY.

Washington, D.C.

Height of land in Connecticut.

The ninth and last edition of the 'Encyclopaedia Britannica' has the statement that there is no land in Connecticut 'above a thousand feet in elevation.' Statements equivalent to this will be found also in 'Appletons' American cyclopaedia' and in 'Johnson's cyclopaedia.' A survey by an engineer, Mr. G. M. Bradford, in 1873, which was based on the survey of the Connecticut western railroad, gives the heights of several points in the north-western part of this state, and these results cannot be much in error. I am indebted to Mr. Henry Norton of Goshen, Conn., for the communication of these heights. It will be remembered that Salisbury is the north-western town of the state, and that east of it, joining Massachusetts, are Canaan and Norfolk: Goshen joins Norfolk on the south. The following are some of the heights above sea-level:—

	Feet.
Ivy Mount (Goshen)	1,642
Haystack Mount (Norfolk)	1,672
Bald Mount (Norfolk)	1,770
Bradford Mount (Canaan)	1,910
Bear Mount (Salisbury)	2,100
Brace Mount (Salisbury)	2,300

It may be thought hardly worth while to dispute any statement made in a cyclopaedia; but, having been born and reared among the beautiful hills of Connecticut, I dislike to see them diminished to one-half their height, even by such a ponderous authority as the 'Encyclopaedia Britannica.'

ASAPH HALL.

June 27.

The ginkgo-tree.

In *Science*, No. 124, Mr. L. F. Ward states that the Frankfort, Ky., ginkgo-trees are the only ones known to him in the United States that have borne fruit. Permit me to say that a group of these trees in Central Park, New-York City, have borne fruit to my knowledge for the past six years, and that in great abundance.

R. P. WHITFIELD.

Amer. mus. nat. hist.,
June 24.

THE FORMATIVE FORCE OF ORGANISMS.

THE assertion is safe, that the majority of biologists incline at present to explain the forming of an organism out of its germ upon mechanical principles. The prevalent conception is, that the forces of the ovum are so disposed that the evolution of the adult organism is the mechanical result of the predetermined interplay of those forces. The object of the present article is to point out that this conception is inadequate, and must be at least supplemented, if not replaced, by another view; namely, that the formative force is a generally diffused tendency, so that all parts inherently tend to complete, by their own growth and modification, the whole organism,—a fact which finds a legitimate hypothetical expression in Darwin's doctrine of pangenesis. The nature of the view here advanced will become clearer upon consideration of the evidence upon which it is based, and which is adduced below. The evidence that the formative force is diffused through all parts falls under three heads: 1. The process of regeneration in unicellular and multicellular bionts; 2. The phenomena of the duplication of parts; 3. All forms of organic reproduction. Let us briefly consider these categories.

1. *Regeneration.* All living organisms have to a greater or less degree the ability to repair injuries: indeed, we must regard the power of regeneration as coextensive with life, but the capacity varies enormously in the different species. In man the power is very small, though more extensive than is generally realized. Among annelids are species the individuals of which may be divided in two, and each piece can regenerate all that is needed to render it a complete worm. We sometimes see a small fragment of a plant, a single switch of a willow for instance, regenerate an entire tree,—roots, trunk, branches, leaves, flowers, and all. In the last instance a few cells possess a latent formative force, which we recognize by its effects, but cannot explain. We perceive, therefore, that each individual has, as it were, a scheme or plan of its organization to which it strives to conform. As long as it actually does so, the cells perform their routine functions; but when an injury destroys or removes some portion, then the remaining cells strive to conform again to the complete scheme, and to add the missing fragment. The act of regeneration of lost parts strikes the imagination almost as an intelligent pursuit by the tissues of an ideal purpose.

Our knowledge of the regenerating power